NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Riparian Forest Buffer

(Acre)

Code 391

DEFINITION

An area of trees and other vegetation consisting of two zones located in areas adjoining and up-gradient from surface water bodies, designed to intercept surface runoff, and subsurface flows from upland sources prior to entry into surface waters and groundwater recharge areas.

PURPOSES

- Create shade to lower water temperatures to improve habitat for fish and other aquatic organisms.
- Provide a source of detritus and large woody debris for fish and other aquatic organisms and riparian habitat and corridors for wildlife.
- Reduce excess amounts of sediment, organic material, nutrients, and pesticides and other pollutants in surface runoff and reduce excess nutrients and other chemicals in shallow groundwater flow.

CONDITIONS WHERE PRACTICE APPLIES

On stable areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands and areas with groundwater recharge.

CRITERIA

Zone 1 – Undisturbed Forest

The location, layout, width, length and woody plant density of the riparian forest buffer will accomplish the intended purpose and function. The buffer will consist of a zone that begins at the normal water line, or at the upper edge of the active channel or shore, and extend a minimum distance of 15 feet, measured horizontally on a line perpendicular to the water course or water body.

Dominant vegetation will consist of existing or planted trees and shrubs suited to the site and the intended purpose. Selection of locally native species will be a priority when feasible. Plantings will consist of two or more species with individual plants suited to the seasonal variation of soil moisture status of individual planting sites (see Figure 1). Plant types and species shall be selected based on their compatibility in growth rates and shade tolerance.

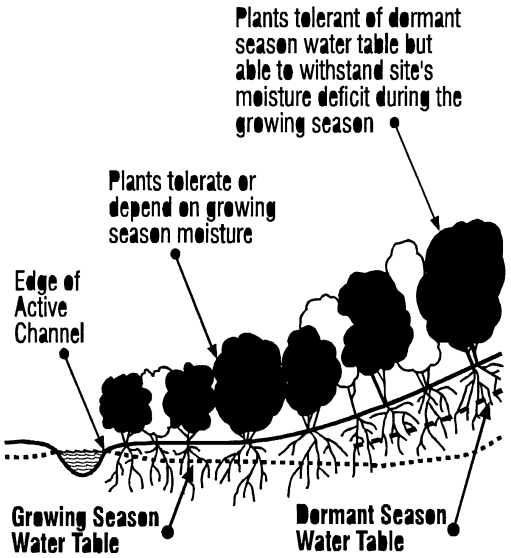

Figure 1. Plant adaptation to soil moisture.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Tree removal is minimized in this zone to allow trees to grow to maturity. Mature trees are needed to lower warm season water temperatures and to provide a source of detritus for fish and other aquatic organisms. However, occasional removal of some tree and shrub products is permitted provided the intended purpose is not compromised by the loss of vegetation or harvesting disturbance. Felling and skidding of trees shall be directed away from the water course or water body. Skidding will be done in a manner that minimizes soil exposure to prevent the creation of ephemeral channels perpendicular to the stream.

An adequate upstream or adjacent seed source must be present when using natural regeneration to establish a buffer.

Necessary site preparation and planting for establishing new buffers shall be done at a time and manner to insure survival and growth of selected species. Site preparation shall be sufficient for establishment and growth of selected species and be done in a manner that does not compromise the intended purpose.

Only viable, high quality and adapted planting stock will be used.

Livestock shall be excluded as necessary to achieve and maintain the intended purpose of the riparian forest buffer. Harmful pests present on the site will be controlled or eliminated as necessary to achieve and maintain the intended purpose.

Zone 2 – Managed Forest

ADDITIONAL CRITERIA TO REDUCE EXCESS AMOUNTS OF SEDIMENT, ORGANIC MATERIAL, NUTRIENTS, PESTICIDES, AND OTHER POLLUTANTS IN SURFACE RUNOFF AND REDUCE EXCESS NUTRIENTS AND OTHER CHEMICALS IN SHALLOW GROUNDWATER FLOW.

An additional strip or area of land, Zone 2, will begin at the edge and up-gradient of Zone 1 and extend a minimum distance of 20 feet, measured horizontally on a line perpendicular to the water course or water body. The minimum combined width of Zones 1 and 2 will be 100 feet or 30% of the floodplain width whichever is less, but no buffer will be less than 35 feet wide. Buffer strips wider than 100 feet may be needed in some instances to satisfy environmental considerations such as wildlife habitat.

Figure 3 illustrates examples of Zone 1 and 2 widths for watercourses and water bodies.

Criteria for Zone 1 shall apply to Zone 2 except that removal of tree and shrub products such as timber, nuts and fruit is permitted on a periodic and regular basis provided the intended purpose is not compromised by loss of vegetation or harvesting disturbance.

Concentrated flow erosion, excessive sheet and rill erosion or mass soil movement shall be controlled in the up-gradient area immediately adjacent to Zone 2 prior to establishment of the riparian forest buffer (see Figure 2).

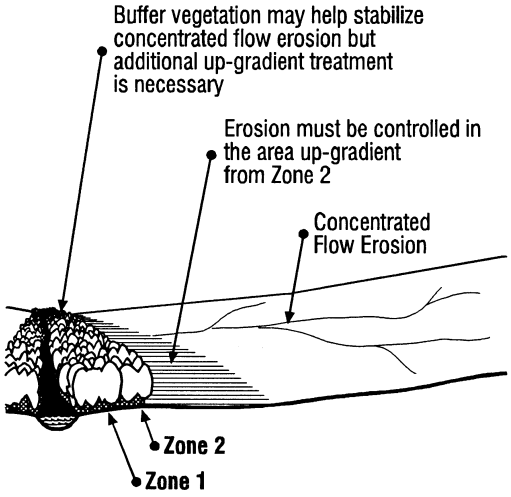

Figure 2. Control of concentrated flow erosion.

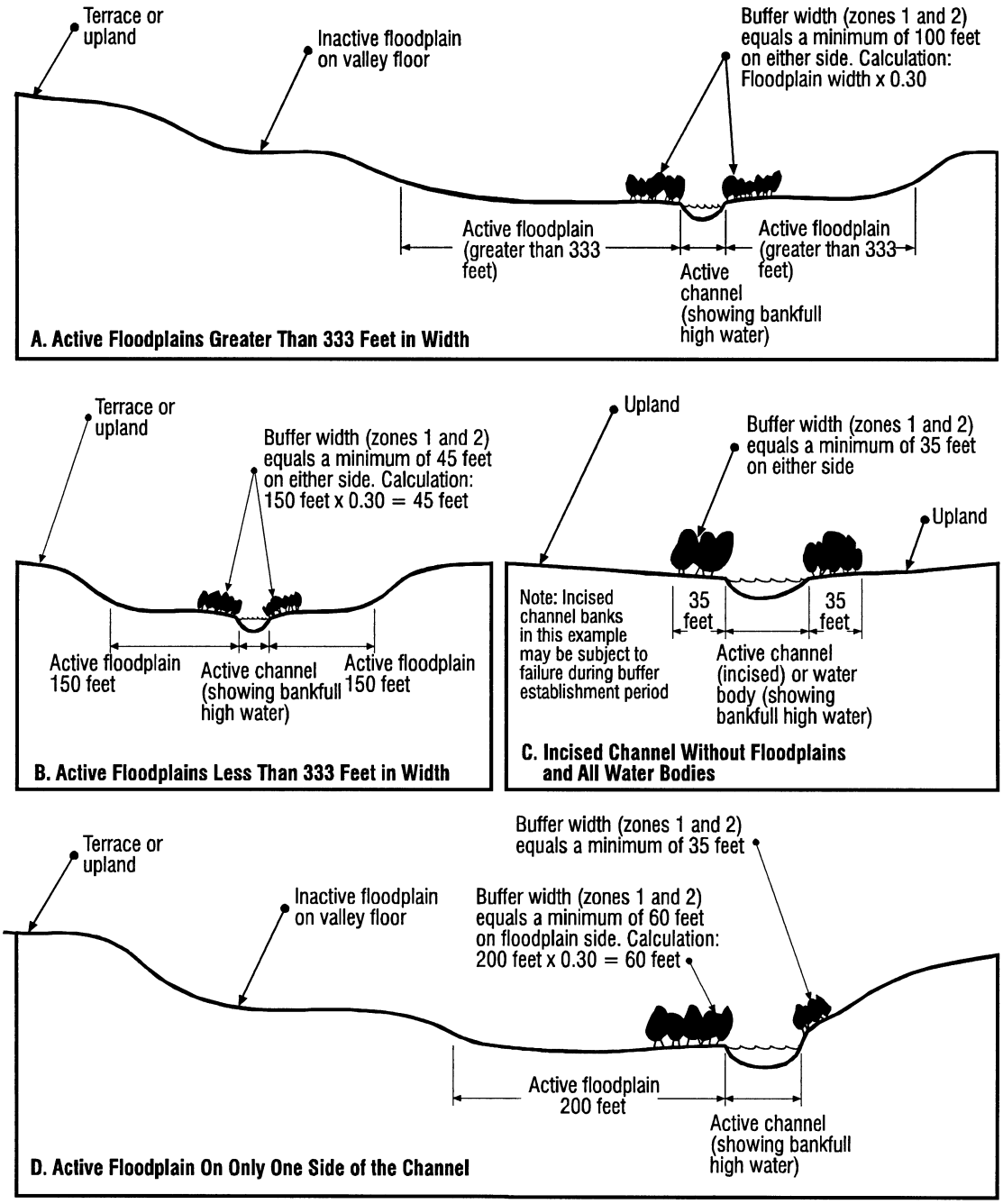

Figure 3. Examples of riparian forest buffer widths for watercourses and water bodies based on active floodplain widths.

ADDITIONAL CRITERIA TO CREATE SHADE TO LOWER WATER TEMPERATURES TO IMPROVE HABITAT FOR FISH AND OTHER AQUATIC ORGANISMS.

A buffer for lowering warm-season water temperatures shall consist of at least Zone 1.

Buffers shall be established or maintained on south and west sides of watercourses and bodies insofar as practical. The buffer canopy shall be established to achieve at least 50 percent crown cover with average canopy heights equal to or greater than the width of the water course or 30 feet for water bodies (see Figure 4).

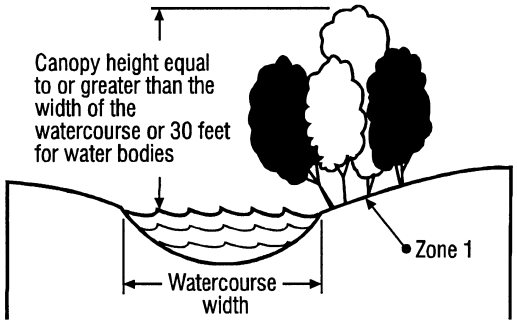

Figure 4. Canopy height for water temperature control.

Place drooping or wide-crowned trees and shrubs nearest the water course or body. Shoreline or channel relief (e.g. deeply incised channels) and topographic shading will be taken into account in selecting species.

ADDITIONAL CRITERIA TO PROVIDE A SOURCE OF DETRITUS AND LARGE WOODY DEBRIS FOR FISH AND OTHER AQUATIC ORGANISMS.

Within Zone 1 as a minimum, establish, favor or manage species capable of producing stems and limbs of sufficient size to provide an eventual source of large woody debris for in-stream habitat for fish and other aquatic organisms.

CONSIDERATIONS

The severity of bank erosion and its influence on existing or potential riparian trees and shrubs should be assessed. Watershed-level treatment or bank stability activities may be needed before establishing a riparian forest buffer.

Where ephemeral, concentrated flow or sheet and rill erosion and sedimentation is a concern in the area up-gradient of Zone 2, consider the application of a vegetated strip consisting of grasses and forbs (see NRCS practice standard (393) Filter Strips for further information). Stiff-stemmed grasses established at the up-gradient edge of Zone 2 will accelerate deposition of sediment (see Figure 5). When concentrated flow or excessive sheet and rill erosion and sedimentation cannot be controlled vegetatively, consider structural or mechanical treatments.

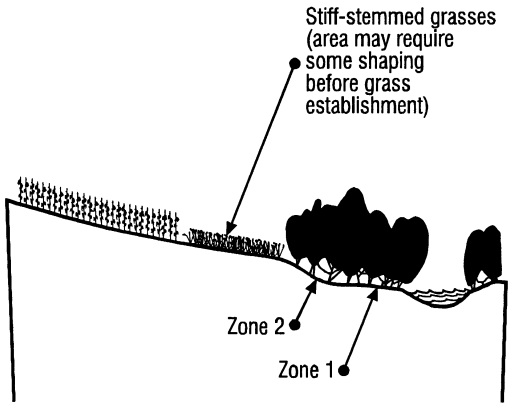

Figure 5. Sediment-trapping above Zone 2.

Joining of existing and new buffers increase the continuity of cover and will further moderate water temperatures. A mix of species with growth forms that are tall and wide-crowned or drooping will increase moderation effects. For watercourses, buffers established on both sides will enhance multiple values.

Favor tree and shrub species that are native and have multiple values such as those suited for timber, biomass, nuts, fruit, browse, nesting, aesthetics and tolerance to locally used herbicides.

Avoid tree and shrub species that may be alternate hosts to undesirable pests or that may be considered noxious or undesirable. Species diversity should be considered to avoid loss of function due to species-specific pests.

Woody phreatophytes (plants that obtain water by the penetration of their roots into the water table) and hydrophytes that deplete ground water should be used with caution in water-deficit areas.

The location, layout and density of the buffer should complement natural features. Avoid layouts and locations that would concentrate flood flows or return flows. Low, flexible-stemmed shrubs will minimize obstruction of local flood flows. Avoid establishing buffers in windthrow prone locations.

Consider the positive and negative impacts beaver, muskrat, deer, rabbits and other local species may have on the successful management of the riparian and stream system. Temporary and local population control methods of these kinds of local species should be used cautiously and within state and local regulations.

Consider the type of human use (rural, suburban, and urban) and aesthetic, social and safety aspects of the area to determine the vegetation selection, arrangement and management. For example, avoid shrubs that block views and prune low tree branches near recreation trails to allow for ease of patrolling.

Species selection criteria to improve aesthetics include seasonal foliage color, showy flowers and fruit, foliage texture, form and branching habit. The layout and design should be appropriate for the setting as determined by adjacent land uses. A landscape analysis can help determine specific aesthetic requirements.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Where appropriate consult the Indiana Division of Forestry or other agencies for planning assistance. Specifications shall be recorded using approved specifications sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. Requirements for operation and maintenance of the practice shall be incorporated into site specifications.

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice and the repair and upkeep of the practice.

The riparian forest buffer will be inspected periodically, and protected and restored as needed, to maintain the intended purpose from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, pesticide use on adjacent lands, livestock damage and fire.

Replacement of dead trees or shrubs and control of undesirable vegetative competition will be continued until the buffer is, or will progress to, a fully functional condition.

As applicable, control of concentrated flow induced erosion or mass soil movement shall be continued in the up-gradient area immediately adjacent to Zone 2 to maintain buffer function.

Any removals of tree and shrub products shall be conducted in a manner that maintains the intended purpose.

For providing habitat and corridors for wildlife, manage the buffer to favor food, shelter and nesting cover that would satisfy the habitat requirements of the indicator or target wildlife. Refer to Habitat Evaluation Procedures by the U.S. Fish and Wildlife Service (FWS) or consult FWS or an IDNR, Division of Fish and Wildlife District Biologist.

For purposes of reducing excess pollutants in surface runoff and shallow groundwater (Zones 1 and 2), or providing habitat and corridors for wildlife (Zone 1 at a minimum), manage the dominant canopy to maintain maximum vigor of overstory and understory species.

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides and other chemicals to assure buffer function shall not compromise the intended purpose. Biological control of undesirable plant species and pests (e.g. using predator or parasitic species, or

grazing of domestic animals) shall be implemented where available and practical.

Additional operation and maintenance requirements shall be developed on a site-specific basis to assure performance of the practice as intended.

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